

*Elements for 1900 March 5, Berlin Mean Time.*

$$\begin{aligned} M &= 244 \ 34 \ 15 \cdot 3 \\ \omega &= 122 \ 55 \ 42 \cdot 3 \\ \Omega &= 174 \ 39 \ 17 \cdot 4 \\ i &= 22 \ 30 \ 32 \cdot 0 \\ \phi &= 4 \ 15 \ 30 \cdot 9 \\ \mu &= 1308'' \cdot 6777 \\ \log a &= 0 \cdot 2887826 \end{aligned} \quad \left. \vphantom{\begin{aligned} M \\ \omega \\ \Omega \\ i \\ \phi \\ \mu \\ \log a \end{aligned}} \right\} 1900 \cdot 0$$

*Ephemeris for 12h. Berlin Mean Time.*

1900.		R.A.			Decl.
		h.	m.	s.	
March 7	...	12	14	55	... -0° 50' 1
11	...	11	56	...	+0° 36' 5
15	...	8	40	...	2 6' 1
19	...	5	13	...	3 37' 3
23	...	12	1	41	5 8' 5
27	...	11	58	10	6 38' 1
31	...	11	54	45	+8 4' 5

CERASKI'S SECOND ALGOL VARIABLE.—In the *Harvard College Observatory Circular*, No. 47, Prof. E. C. Pickering furnishes the additional data respecting this variable which are available from the photometric records of the Henry Draper Memorial. The Moscow photographs furnish the means of determining the period of an interval of four years; the Harvard records increase this interval to nine years. With the aid of the latter it is found that the formula of Prof. Ceraski only satisfies the later observations, and to remedy this the period he gives should be shortened by 0·6m.; the resulting period of 6d. oh. 8·8m. satisfying all the observations since 1890 very accurately, but more observations of the minima will give a still closer value. The period, however, differs so slightly from exactly six days that for a long time the minima cannot be observed in certain longitudes. Accordingly, while observations may be obtained in the ensuing autumn in Europe, or better still in Asia, minima cannot be observed in America until the following year.

Five stars of the Algol class, viz. S Cancri, U Cephei, W Delphini, +45° 3062 and the star here under discussion are especially interesting owing to the large variation in their light, which amounts to about two magnitudes in each case. It is noteworthy that of these two were found by Mdme. Ceraski, and one by her distinguished husband.

THE NEW ODESSA OBSERVATORY.—Herr A. Orbinski, who has been appointed director of the new astronomical observatory at Odessa, has recently issued his first report, dealing with the foundation of the institution, its instrumental equipment, and the scope of the proposed programme of investigation.

The observatory has been established as a branch to the great national institution by the governing body of the Pulkova Observatory, chiefly owing to the efforts of Prof. O. Backlund during 1895 and afterwards.

In the summer of 1897 the building operations were commenced, and in August of the following year, 1898, the transit instrument was installed, the vertical circle being set in position during February 1899. The buildings are three in number—a transit house, and two buildings for housing the meridian marks, or collimators. The instrumental equipment consists of a transit circle, with clock, chronograph and meridian marks, and a vertical circle.

The transit has an objective of 108 mm. aperture and 1·30 m. focal length, by Steinheil, and is furnished with a self-registering micrometer, by Repsold. The meridian marks are situated about 119 metres north and south of the transit pier, and consist of round plates, each pierced with a small hole 1·5 mm. in diameter, which being illuminated from behind by an electric lamp, forms an artificial star of about 2·1 magnitude.

The vertical circle, by Repsold, has a Steinheil objective of 108 mm. aperture and 1·40 m. focal length. Both these instruments are mounted in the same transit house, which is so constructed that, the central portion remaining stationary, the ends may be traversed eastwards and westwards respectively, thus uncovering the instruments.

The programme of the observatory is to be somewhat similar to that at Pulkova, except that observations of stars are to be made alternately with each instrument night by night, and not with both together, the first list of 176 stars being included in the report.

## HARTLEY BOTANICAL LABORATORIES OF UNIVERSITY COLLEGE, LIVERPOOL.

AFTER occupying for twelve years small and, in many respects, unsuitable rooms in the old College buildings, the botanical department of University College, Liverpool, is at length to be housed in a new and commodious institute, the munificent gift of Mr. W. P. Hartley, of Aintree, Liverpool.

The site of the new buildings, also purchased by Mr. Hartley for the College, is a very fine one. The buildings have an east frontage of 37 feet and a north frontage of 85 feet. The total height to the eaves is 54 feet, divided into three principal stories, with two mezzanines in addition to a basement.

The main entrance leads through a vestibule, 8 feet wide, into a hall, 23 feet by 20 feet, in which is placed the staircase, 6 feet wide, open by means of a well to the lantern light at the top of the building.

The basement floor is occupied by store-rooms, lavatories and heating chamber.

The ground floor is mainly occupied by the museum, 45 feet long by 34 feet broad. This is surrounded at a height of 10 feet 6 inches by a balcony with open ironwork balustrade, which can be entered from the mezzanine floor or by an iron spiral staircase from the ground floor of the museum. The museum will throughout be fitted with cases made of American canary wood with movable glass shelves. It is intended that these cases shall contain not only morphological specimens illustrative of the scientific aspect of botany, but also specimens of all products of the vegetable kingdom used in the arts, such as timbers, pharmaceutical products, cottons, hemp, flax, and food products, both in the raw and in the manufactured state. It is hoped that by this means the new botanical laboratories will become a centre of information for the general public on matters of economic botany as well as on the more strictly scientific aspects of the science.

The museum will be provided with a lift running to all the floors above, so enabling specimens to be expeditiously and conveniently made available for teaching purposes in the laboratories and class-rooms.

On the ground floor also there is a workshop fitted with lathe, carpenter's bench and tools, so that small repairs may be carried out and simple machinery constructed without necessitating the calling in of special workmen.

There is also, in connection with the museum, a preparation room, in which stock museum jars and boxes will be kept, and in which the various specimens to be exhibited in the museum will be mounted, prepared and labelled.

The first mezzanine floor is partly occupied, as already mentioned, by the museum balcony; but there is also on this floor a small class-room fitted for about twenty students, furnished with the necessary fittings for the teaching of advanced lecture classes; and the herbarium fitted throughout with dust-tight cases and boxes for dried plants. Room is also provided on this floor for a staff lavatory.

On the first floor is placed the large lecture theatre. This room, which is 45 feet long by 34 feet broad, will accommodate 100 students. The seats are raised at the back by a gradually increasing upward curve, and the room is fitted with a specially designed lecture table, carrying electric switches, gas, water, and other needful appliances for public lectures. Opening off the theatre is the professor's private room, with an adjacent private laboratory, both of which will be furnished and equipped with the requisite bookcases, apparatus cases, and laboratory appliances. On this floor also is situated the departmental library, whose shelves will be furnished with not only the best known botanical text-books for reference, but also with several of the more important botanical journals.

The second mezzanine floor carries the research laboratory, the experimental physiology laboratory, and the dark room. These rooms, perhaps the most important in the building, will be fitted with all the more essential appliances for anatomical and physiological research, whilst the dark room will be available both for microphotographic work and for such physiological experiments as can be conducted only in the absence of light.

On the second or top floor is placed the large and magnificently lighted junior laboratory, capable of accommodating sixty-five students at one time, and fitted with specially constructed benches, cases for microscopes and apparatus, and the necessary teaching appliances. There will also be placed on this floor a fully equipped senior laboratory, capable of accom-

modating twelve students, as well as demonstrators' private room and laboratory.

On the roof there will be a small greenhouse with access from the junior laboratory.

The buildings will be lit throughout with electric light, and there will be electric bell and speaking-tube communication between the different private rooms, porter's room, and workshop.

The whole of the furniture and fittings have been designed by Professor Harvey Gibson and Mr. F. W. Dixon, the architect, so as to facilitate in every possible way the work both of students and teachers.

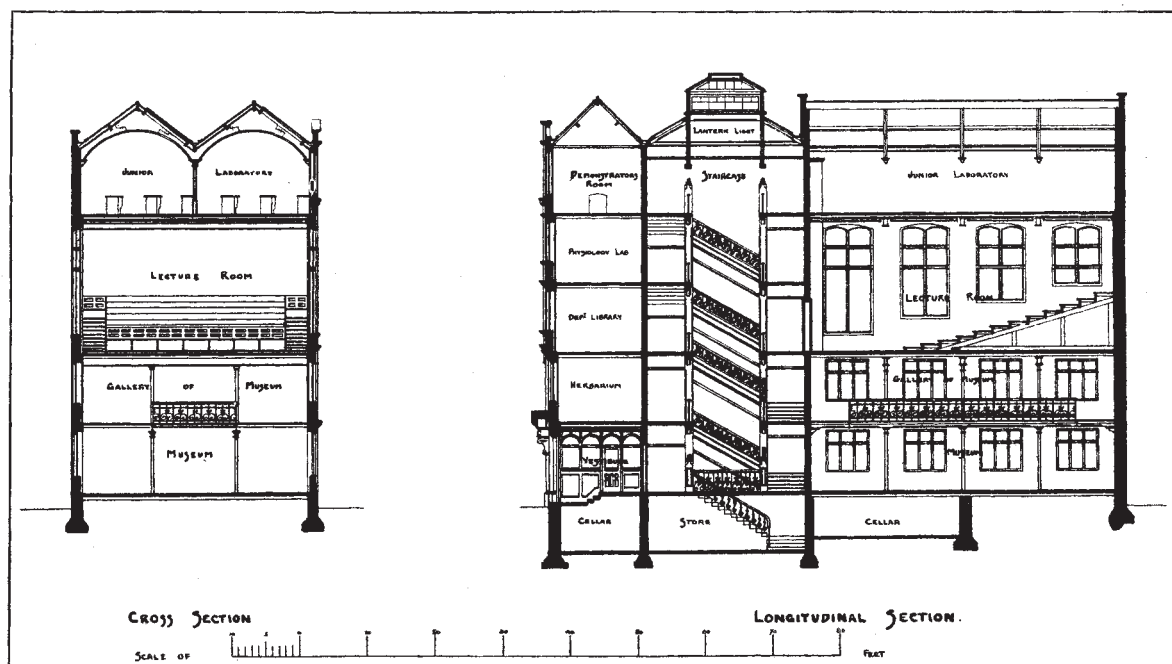
The furniture generally will be of pitch pine, and the cases of polished Canary wood. The staircase will have solid polished stone steps, and the walls will be plastered and painted. Externally the buildings will be faced with  $2\frac{1}{4}$ -inch Ruabon brick with red sandstone dressings.

teachers. In this school, as in all others in this province, two hours' instruction weekly in fruit culture, gardening, and general farming during the last two years of the course is required. This has been compulsory by law since 1895. Outline suggestions for this work are sent the principal of the school by the provincial government, as follows:—

#### OUTLINE OF AGRICULTURAL COURSE IN THE HIGHER GRADES OF RURAL SCHOOLS IN THE GERMAN RHINE PROVINCE.

##### *First Year.*

*April and May.*—(1) Inner structure of plants; plant cells and tissues and their functions. (2) Outer divisions of plants: (a) The roots—their function in the nourishment of plants by the absorption of mineral matter, as phosphorus, potassium, sodium, iron, chlorine, and water; (b) the trunk—its branches



Hartley Botanical Laboratories, University College, Liverpool.

Altogether it may be said that Mr. Hartley's gift will provide University College, Liverpool, with a botanical laboratory worthy to stand alongside of the pathological and physiological laboratories, the recent splendid gift to the College of Mr. Thompson Yates. The building will be taken in hand immediately, and will, in all probability, be ready for occupation before the beginning of the autumn term of 1901.

#### SCHOOL GARDENS.

AS attention is being given to the question as to the subjects which should be taught in rural primary schools, and as the observation of living things under natural conditions is slowly coming to be regarded as an essential part of the education of a child in the country, a description of a course of instruction of this kind, given in a German elementary school, is of interest at the present time. Such an account, by Mr. C. B. Smith, has been published by the U. S. Department of Agriculture as *Circular No. 42*, and is here summarised.

The school is situated at Alfter, a village of some 2000 inhabitants, in the German Rhine Province, between Bonn and Cologne, and is what is known as a "people's school," which is equivalent to our public elementary school. Only the fundamental branches are taught in these schools, and the whole course is completed in eight years.

The Alfter common school contains 400 pupils and six

and buds, the structure of the cambium, and the occurrence of ring growths.

*June.*—(1) The leaf; the nature and function of chlorophyll in the life of the plant and the effect of light on chlorophyll development; breathing of plants; nourishment of plants from atmospheric constituents—carbon, nitrogen, oxygen. (2) The blossom and its fertilisation. (3) The fruit; seeds; reproduction of plants by seeds and by division of members.

*July.*—(1) The soil and its improvement—lime soil, clay soil, loams, sand. (2) The using up of plant food and its replacement by barnyard manure, compost, wood ashes, and indirect manures, as lime and gypsum. (3) Influence of the climate on plants.

*August.*—(A) Fruit culture. (1) Planting and nursery management of seedlings. (2) The most important methods of fruit improvement—root and stem grafting and budding with active and dormant buds. (3) Management of improved seedlings in the nursery—formation of the trunk and top; transplanting; handling of trained trees, especially espalier forms, with reference to their training against schoolhouse walls. (4) Culture of small fruits—gooseberries, currants, raspberries, strawberries and blackberries; setting grape-vines and their afterculture.

*September.*—(B) Fruit utilisation. (1) Ripening of the fruit; gathering, sorting, and storing winter fruits. (2) Fruit varieties—selection of the more commendable sorts with regard to their suitability to different climates and soils and at varying